Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		Cost Date	O&M Cost ($K/year)		Cost Date	Description
			Low	High		Low	High		
Roadside Telecommunications (RS-TC)									
DS0 Communication Line	TC001	20	0.5	1	1995	0.6	1.2	2003	56Kbps capacity. Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
DS1 Communication Line	TC002	20	0.5	1	1995	4.8	8.4	2002	1.544Mbps capacity (T1 line). Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
DS3 Communication Line	TC003	20	3	5	1995	24	72	2001	44.736 Mbps capacity (T3 line). Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
ISP Service Fee	TC007					0.18	0.6	2002	Monthly service fee ranges from $15 per month for regular dial-up service to $50 per month for DSL.
Direct Bury Armor Encased Fiber Cable			60		1999	0.02		1999	Cost is per mile. Includes cable and installation.
Conduit Design and Installation - Corridor		20	50	65	2003	0.02		1999	Cost is per mile. Includes boring, trenching, and conduit (3 or 4 inch). Cost would be significantly less for an aerial installation. In-ground installation would cost significantly less if implemented in conjunction with a construction project.
Twisted Pair Installation		20	12		1999	0.02		1999	Cost is per mile.
Fiber Optic Cable Installation		20	20	50	2003	0.02		1999	Cost is per mile for cable and in-ground installation. Cost would be significantly less for an aerial installation. In-ground installation would cost significantly less if implemented in conjunction with a construction project.
Cellular Communication			0.5		1999	0.3	0.4	1999	Cost is for one unit.
900 MHz Spread Spectrum Radio		10	9		1999	0.15	0.4	1999	Cost is per link.
Microwave Communication		10	10	20	2002	0.5	1	2002	Cost is per link. Cost could be higher depending on tower/antenna installation.
Wireless Communications, Low Usage	TC004					0.12	0.2	2003	125 Kbytes/month available usage (non-continuous use).
Wireless Communications, Medium Usage	TC005					0.6	0.7	1995	1,000 Kbytes/month available usage (non-continuous use).
Wireless Communications, High Usage		20	0.5	1	1995	1.2	1.8	2002	3,000 Kbytes/month available usage (non-continuous use).
Call Box		10	4	5.9	2002	0.714		1999	Capital cost includes call box and installation. O&M is cost per unit (per year) for service maintenance contract and annual cellular service fee.
Roadside Detection (RS-D)									
Inductive Loop Surveillance on Corridor		5	3	8	2001	0.5	0.8	1995	Double set (4 loops) with controller, power, etc.
Inductive Loop Surveillance at Intersection		5	9	16	2003	1	1.6	1999	Four legs, 2 lanes/approach.
Machine Vision Sensor on Corridor		10	21.7	29	2003	0.2	0.4	2003	One sensor both directions of travel. Does not include installation.
Machine Vision Sensor at Intersection		10	20	25.7	2003	0.2	0.5	2003	Four-way intersection, one camera per approach. Does not include installation.
Passive Acoustic Sensor on Corridor			3.7	8	2002	0.2	0.4	1998	Cost range is for a single sensor covering up to 5 lanes. Low cost is for basic sensor, which consists of the sensor, mounting kit, junction box, & cabinet termination card. High cost includes basic sensor with solar and wireless option. This option consists of an antenna, solar charger, battery, & panel, and wireless base station, which will handle up to 8 sensors. Capital costs do not include installation or mounting structure.
Passive Acoustic Sensor at Intersection			5	15	2001	0.2	0.4	2002	Four sensors, 4 leg intersection.
Remote Traffic Microwave Sensor on Corridor		10	3.3	6	2002	0.1		2001	One sensor both directions of travel. Includes installation.
Remote Traffic Microwave Sensor at Intersection		10	18		2001	0.1		2001	Four sensors, 4 leg intersection. Includes installation.
Infrared Sensor Active			6	7.5	2000				Sensors detects movement in two directions and determines vehicle speed, classification, and lane position.
Infrared Sensor Passive			0.7	1.2	2002				Sensor covers one lane and detects vehicle count, volume, and classification.
CCTV Video Camera	RS007	10	7.5	17	2003	1.5	2.4	2001	Cost includes color video camera with pan, tilt, and zoom (PTZ), and installation.
CCTV Video Camera Tower	RS008	20	4	12	2003				Low cost is for a 35 ft. tower. High cost is for 90 ft. tower. Includes foundation, pole, conduit, and labor.
Pedestrian Detection Microwave			0.6		2001				Cost is per device. Typical deployment consists of 2 devices per crosswalk for detection of pedestrian in crosswalk. Can be used for detection of pedestrian at the curbside.
Pedestrian Detection Infrared			0.3	0.5	2002				Cost is per device. Does not included installation. Typical deployment consists of 2 devices per crosswalk for detection of pedestrian at the sidewalk. Can be used for detection of pedestrian in the crosswalk.
Environmental Sensing Station (Weather Station)		25	30	50	2003	1.9	4.1	2003	Environmental Sensing Station (ESS), also known as a weather station, consists of pavement temperature sensor, subsurface temperature sensor, precipitation sensor (type & rate), wind sensor (speed & direction), air temperature and humidity sensors, visibility sensors, and remote processing unit (RPU). ESS provide condition data and are basic components of larger Road Weather Information Systems (see RWIS under TMC subsystem). RPU replaced every 5 years at $6.4K. O&M includes calibration, equipment repairs, and replacement of damaged equipment. O&M costs could be higher if state provided maintenance.
Traffic Camera for Red Light Running Enforcement			75	136	2001	60		2001	Low capital range is for a 35-mm wet film camera, which includes installation of the camera ($25K) and associated equipment (e.g., pole, loop detectors, cabinet foundation). High capital range is for digital camera, which includes a total of 2 cameras for a 3-lane approach. O&M cost is for one 35-mm wet film camera per year. Note, most jurisdictions contract with a vendor to install and maintain, and process the back office functions of the RLR system. The vendor receives compensation from fines charged to violators.
Lowering System		20	8	10.5	2003				Cost includes the lowering system and the pole (pole height ranging 40 feet to 70 feet). Installation costs not included. The lowering system is mechanically operated; requires routine lubrication.
Portable Speed Monitoring System		15	5	15	2002				Trailer mounted two-digit dynamic message sign, radar gun, computer; powered by generator or operates off of solar power; and requires minimal operations and maintenance work. The system determines a vehicle's speed with the radar gun and displays the current speed, in real-time, and also stores the speeds in a computer for further analysis.
Portable Traffic Management System			80	100	2003				This portable unit collects traffic data, communicates with a central control facility, and displays real time traffic information to travelers. The system includes a trailer mounted dynamic message sign and mast equipped with a PTZ video camera, sensors, and wireless communications. Cost will vary depending on the type and number of traffic sensors installed.

Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		Cost Date	O&M Cost ($K/year)		Cost Date	Description
			Low	High		Low	High		
Roadside Control (RS-C)									
Linked Signal System LAN	RS002	20	40	70	1995	0.4	0.8	1995	This element provides the connections to the linked signal system.
Signal Controller Upgrade for Signal Control	RS003	20	2.5	6	2003	0.2	0.5	1995	Local controller upgrade to provide advanced signal control.
Signal Controller and Cabinet			8	15	2003	0.2	0.5	2001	Includes installation of traffic signal controller and cabinet per intersection.
Traffic Signal			95	115	2001	2.4	3	1999	Includes installation for one signal (four leg intersection), conduit, controller, and detection device. Cost ranges from traffic signal with inductive loop detection (low) to non-intrusive detection (high).
Signal Preemption Receiver	RS004	5	2	8	1995	0.05	0.2	1995	Two per intersection. Complement of IDAS elements RS005 and TV004.
Signal Controller Upgrade for Signal Preemption	RS005	10	2	5	1995				Add-on to base capability (per intersection). Complement of IDAS elements RS004 and TV004.
Roadside Signal Preemption/Priority			2.5	5.5	2003				Includes infrared detector, detector cable, phase selector, and system software. Capital costs range is for 2-directions (low) and 4-directions (high). Does not include installation costs. Complement to transit (or emergency vehicle) on-board Signal Preemption/Priority Emitter.
Ramp Meter	RS006	5	25	50	2003	1.2	2.8	2003	Includes ramp meter assembly, signal displays, controller, cabinet, detection, and optimization.
Software for Lane Control	RS011	20	25	50	1995	2.5	5	1995	Software and hardware at site. Software is off-the-shelf technology and unit price does not reflect product development.
Lane Control Gates	RS012	20	100	150	1995	2	3	1995	Per location.
Fixed Lane Signal	RS009	20	6	8	1995	0.6	0.8	1995	Cost per signal.
Automatic Anti-icing System Short span		12	25		1998	2		1998	Typical automatic anti-icing system consists of a control system, chemical storage tank, distribution lines, pump, and nozzles. Pump and control hardware replaced every 5 years at cost of $3.5K. For a short span system ranging from 120 to 180 feet. O&M includes system maintenance, utilities, materials, and labor.
Automatic Anti-icing System Long Span		12	50	495	1999	1.5	29.5	1999	Typical automatic anti-icing system consists of a control system, chemical storage tank, distribution lines, pump, and nozzles. Pump and control hardware replaced every 5 years at cost of $3.5K. For a long span system ranging from 320 feet to greater than 1/2 mile. O&M includes system maintenance, utilities, materials, and labor. The high O&M cost is for a much larger system; hence, the need for a greater amount of materials.
Roadside Information (RS-I)									
Roadside Message Sign	RS010	20	50	75	1995	2.5	3.75	1995	Fixed message board for HOV and HOT lanes.
Wireline to Roadside Message Sign	RS013	20	6	9	1995				Wireline to VMS (0.5 mile upstation).
Variable Message Sign	RS015	20	48	120	2003	2.4	6	2003	Low capital cost is for smaller VMS installed along arterial. High capital cost is for full matrix, LED, 3-line, walk-in VMS installed on freeway. Cost does not include installation.
Variable Message Sign Tower	RS016	20	25	120	2003				Low capital cost is for a small structure for arterials. High capital cost is for a larger structure spanning 3-4 lanes. VMS tower structure requires minimal maintenance.
Variable Message Sign - Portable		14	21.5	25.5	2002	1.2	2	2000	Trailer mounted VMS (3-line, 8" character display); includes trailer, solar or diesel powered.
Highway Advisory Radio	RS017	20	16	32	2001	0.6	1	2001	Capital cost is for a 10-watt HAR. Includes processor, antenna, transmitters, battery back-up, cabinet, rack mounting, lighting, mounts, connectors, cable, and license fee. Super HAR costs an additional $9-10K (larger antenna). Primary use of the super HAR is to gain a stronger signal.
Highway Advisory Radio Sign		10	5	9	2003	0.25		2003	Cost is for a HAR sign with flashing beacons. Includes cost of the controller.
Roadside Probe Beacon	RS020	5	5	8	2001	0.5	0.8	2001	Two-way device (per location).
LED Count-down Signal		10	0.325	0.45	2001				Costs range from low (two 12x12-inch dual housing unit) to high (16X18-inch single housed unit). Signal indicates time remaining for pedestrian to cross, and a walk or don't walk icon. Count-down signals use low 8-watt LED bulbs, which require replacement approximately every 5-7 years.
Pedestrian Crossing Illumination System		5	27.5	42	2003	2.75	4.2	2001	The capital cost range includes cost of equipment and installation. Equipment includes fixtures - 4 lamps per lane - for a three lane crosswalk, controller, pole, and push button activator. Installation is estimated at 150 - 200 % of the total equipment cost. Capital cost would be greater if the system included automated activation of the in-pavement lighting system. O&M is approximately 10% of the equipment cost.
Variable Speed Display Sign			3.7	5	2001				Low range is for a variable speed limit display system. High range includes static speed sign, speed detector (radar), and display system.
Roadside Rail Crossing (R-RC)									
Rail Crossing 4-Quad Gate, Signals	RS021	20	115	130	1995	4.25	4.85	1995	Gates and signals.
Rail Crossing Train Detector	RS022	20	16	21.5	1995	0.77	1.03	1995	Train detector circuitry and communication line from intelligent interface controller (IIC) to wayside interface equipment (WIE). Assume two track crossing with two 0.5 mile communication lines.
Rail Crossing Controller	RS023	10	8	10	1995	0.4	0.5	1995	Intelligent interface controller (IIC).
Rail Crossing Pedestrian Warning Signal, Gates	RS024	20	10	15	1995	0.2	0.3	1995	Pedestrian warning signal and gates.
Rail Crossing Trapped Vehicle Detector	RS025	10	25	30	1995	1.25	1.5	1995	Entrapped vehicle detection camera, with poles and controller.
Parking Management (PM)									
Entrance/Exit Ramp Meters		10	2	5	1995	0.2	0.5	1995	Ramp meters are used to detect and count vehicles entering/existing the parking facility. O&M costs based on annual service contract.
Tag Readers		10	2	5	1995	0.2	0.5	1995	Readers support electronic payment scheme. O&M costs based on annual service contract.
Database and Software for Billing & Pricing		10	10	15	1995	1	2	1995	Database system contains parking pricing structure and availability. O&M costs based on annual service contract.
Parking Monitoring System		10	21	46	1998				Includes installation, detectors, and controllers.
Toll Plaza (TP)									
Electronic Toll Reader	TP001	10	2	5	2001	0.2	0.5	2001	Readers (per lane). O&M is estimated at 10% of capital cost.
High-Speed Camera	TP002	10	7	10	2003	0.5	1	1995	Cost includes 1 camera/2 lanes.
Electronic Toll Collection Software	TP003	10	5	10	1995				Includes COTS software and database.
Electronic Toll Collection Structure	TP004	20	10	15	1995				Mainline structure.

Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		Cost Date	O&M Cost ($K/year)		Cost Date	Description
			Low	High		Low	High		
Remote Location (RM)									
CCTV Camera	RM001	7	2.1	5	2003	0.1	0.25	2003	Interior fixed mount camera for security. Low cost represents black & white pan/tilt/zoom (PTZ). High cost represents color PTZ. Does not include installation.
Integration of Camera with Existing Systems	RM002	10	2	2.5	1995				Per location.
Informational Kiosk	RM003	7	12	25	2001	1.2	5	1998	Includes hardware, enclosure, installation, modem server, and map software.
Integration of Kiosk with Existing Systems	RM004	7	2.2	27.4	1995				Software costs are for COTS (low) and developed/outdoor (high).
Kiosk Upgrade for Interactive Usage	RM005	5	5	8	1995	0.5	0.8	1995	Interactive information display interface (upgrade from existing interface).
Kiosk Software Upgrade for Interactive Usage	RM006	5	10	12	1995				Software is COTS.
Transit Status Information Sign		10	4	8	2002				A LED display installed at transit terminal that provides status information on transit arrival. Cost depends on quality, size, and controller capabilities.
Smart Card Vending Machine	RM007	5	37	40	1995	1.85	2	1995	Ticket vending machine for smart card.
Software, Integration for Smart Card Vending	RM008	20	3	5	1995				Software is COTS.
Emergency Response Center (ER)									
Basic Facilities, Comm for Large Area	EM006		4000		1995	400	600	1995	For population >750,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Basic Facilities, Comm for Medium Area	EM007		3200		1995	400	480	1995	For population <750,000 and >250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Basic Facilities, Comm for Small Area	EM008		2800		1995	400	420	1995	For population <250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Emergency Response Hardware	EM001	5	6	9	2003	0.12	0.18	2003	Includes 3 workstations. O&M is estimated at 2% of capital cost.
Emergency Response Software	EM002	10	70	150	1995	0.5	3.5	1995	Includes emergency response plans database, vehicle tracking software, and real time traffic coordination.
Emergency Response Labor	EM003					50	165	1995	Two people. Salary costs are fully loaded including salary, overtime, overhead, benefits, etc.
Emergency Management Communications Software	EM004	20	5	10	1995	2.5	5	1995	Shared database between 4 sites. Cost is per site; software is COTS.
Hardware, Software Upgrade for E-911 and Mayday	EM005	10	105	180	1995	1.7	2.5	1995	Data communications translation software, E911 interface software, processor, and 3 workstations.
800 MHz. 2-way Radio		5	0.8	1.7	2001	0.09	0.12	2001	Cost is per radio.
Emergency Vehicle On-Board (EV)									
Communications Interface	EV001	10	0.3	2	1995	0.02		1995	Emergency vehicle communications. Cost is per vehicle.
Signal Preemption/Priority Emitter			0.5	2.1	2003				Data-encoded emitter; manually initiated. Complement to Roadside Signal Preemption/Priority (see Roadside Control subsystem).
Information Service Provider (ISP)									
Basic Facilities, Comm for Large Area	IS019		4000		1995	400	600	1995	For population >750,000. (stand-alone) Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Basic Facilities, Comm for Medium Area	IS020		3200		1995	400	480	1995	For population <750,000 and >250,000. (stand-alone) Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Basic Facilities, Comm for Small Area	IS021		2800		1995	400	420	1995	For population <250,000. (stand-alone) Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Information Service Provider Hardware	IS001	5	26	35	2003	0.5	0.7	2003	Includes 2 servers and 5 workstations. O&M is estimated at 2%; could be higher for responsive and preventative maintenance.
Systems Integration	IS017	20	90	110	1998				Integration with other systems.
Information Service Provider Software	IS002	20	275	550	1995	13.75	27.5	1995	Includes database software (COTS) and traffic analysis software.
Map Database Software	IS003	2	15	30	2003				Software is COTS.
Information Service Provider Labor	IS004					175	250	1995	2 Staff @ 50K to 75K and 1 staff @ 75K to 100K. Salary cost are fully loaded prices and include base salary, overtime, overhead, benefits, etc.
FM Subcarrier Lease	IS005					120	240	1995	Cost is per year.
Hardware Upgrade for Interactive Information	IS006	5	12	16	2003	0.24	0.32	2003	Includes 1 server and 2 workstations. O&M is estimated at 2%; could be higher for responsive and preventative maintenance.
Software Upgrade for Interactive Information	IS007	20	250	500	1995	12.5	25	1995	Trip planning software (includes some development costs).
Added Labor for Interactive Information	IS008					100	150	1995	1 Staff @ 50K to 75K for two shifts. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Software Upgrade for Route Guidance	IS009	20	250	500	1995	12.5	25	1995	Route selection software. Software is COTS.
Map Database Upgrade for Route Guidance	IS010	2	100	200	1995				Map database software upgrade.
Hardware Upgrade for Emergency Route Planning	IS011	5	8	10	2003	0.16	0.2	2003	Includes 1 server. O&M is estimated at 2%; could be higher for responsive and preventative maintenance.
Software Upgrade for Emergency Route Planning	IS012	20	50	100	1995	2.5	5	1995	Route guidance software. Software is COTS.
Hardware Upgrade for Dynamic Ridesharing	IS013	5	4	6	2003	0.08	0.12	2003	Includes 2 workstations. O&M is estimated at 2%; could be higher for responsive and preventative maintenance.
Software Upgrade for Dynamic Ridesharing	IS014	20	100	200	1998	5	10	1995	Software includes some development cost.
Added Labor for Dynamic Ridesharing	IS015					100	150	1995	1 Staff @ 50K to 75K for two shifts. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Liability Insurance for Dynamic Ridesharing	IS016					50	100	1995	50K to 100K per year.
Software Upgrade for Probe Information Collection	IS018	20	250	500	1995	12.5	25	1995	Software includes COTS and some development cost.

Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		Cost Date	O&M Cost ($K/year)		Cost Date	Description
			Low	High		Low	High		
Transportation Management Center (TM)									
Basic Facilities, Comm for Large Area	TM040		3500	8000	2003	350	1200	2003	For population >750,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc. O&M is estimated at 10-15% of the capital cost.
Basic Facilities, Comm for Medium Area	TM041		3200	3200	1995	400	480	1995	For population <750,000 and >250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc. O&M is estimated at 10-15% of the capital cost.
Basic Facilities, Comm for Small Area	TM042		2800	2800	1995	400	420	1995	For population <250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc. O&M is estimated at 10-15% of the capital cost.
Hardware for Signal Control	TM001	5	18.5	28.5	2003	9	10.5	2003	Includes I server and multiple workstations. O&M includes responsive and preventative maintenance.
Software, Integration for Signal Control	TM006	5	105	150	2003	150		2003	Software and integration for a large urban area. Cost would be lower (approx.$10,500) for a few arterial intersections. O&M includes software upgrades, revisions, and expansion of the system.
Labor for Signal Control	TM002					486	594	2001	Costs include labor for operations (2 @ 50% of the time, at 100K), transportation engineer (1 at 50% of the time, at 100K), update timing plans (2K per system per month for every 10 systems), and signal maintenance technician (2 @ 75K). Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Hardware, Software for Traffic Surveillance	TM003	20	135	165	1995	6.75	8.25	1995	Processor and software.
Integration for Traffic Surveillance	TM032	20	225	275	1995	11.25	13.75	1995	Integration with other systems.
Hardware for Freeway Control	TM004	5	6	9	2003	0.3	0.45	2003	Includes 3 workstations. O&M estimated at 5% of capital cost.
Software, Integration for Freeway Control	TM007	5	180	220	2002				Software and integration, installation and 1 year maintenance. Software is off-the-shelf technology and unit cost does not reflect product development.
Labor for Freeway Control	TM005					225	275	2001	Labor for operations (2 @ 50% of 100K) and maintenance technicians (2 @ 75K). Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Hardware for Lane Control	TM008	5	2	3	2003	0.1	0.15	2003	Includes 1 workstation and 19" monitor. O&M estimated at 5% of capital cost.
Software, Integration for Lane Control	TM009	10	225	275	1995	11.25	13.75	1995	Software development and integration and software upgrade for controllers. Software development is fine tune adjustments for local installations. Otherwise, software is COTS.
Labor for Lane Control	TM010					90	110	2001	Labor for 2 operators @ 50% of 100K.
Software, Integration for Regional Control	TM011	10	300	400	1998				Software and integration, installation and 1 year maintenance. Integration with other TMC's. Software is COTS.
Real-time, Traffic Adaptive Signal Control System		10	120	150	2001	20		2001	The costs range is based on commercially available packages, which run on a centralized computer. The high capital cost includes software packages for graphical user interface and incident management.
Labor for Regional Control	TM012					180	220	2001	Labor for operators (2 @ 50% of 100K), transportation engineer (1 @ 50% of 100K), and maintenance contract. Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Video Monitors, Wall for Incident Detection	TM013	15	57	103	2003	3	5	2003	Video wall and monitors. O&M estimated at 5% of capital cost.
Hardware for Incident Detection	TM014	5	43	57	2003	2.15	2.85	2003	Includes 4 servers, 5 workstations, and 2 laser printers. O&M estimated at 5% of capital cost; could be higher for responsive and preventative maintenance.
Integration for Incident Detection	TM025	20	90	110	1995	4.5	5.5	1995	Integration with other systems.
Software for Incident Detection	TM015	5	90	110	2002	4.5	5.5	2002	Software is COTS and includes development cost. O&M is estimated at 5% of capital.
Labor for Incident Detection	TM016					630	770	2001	Labor for operators (4 @ 100K and 1 manager @ 150K) and 2 maintenance techs @ 75K.
Video Monitor for Incident Response	TM017	5	0.6	1.5	2003				Includes 1 19" monitor.
Hardware for Incident Response	TM018	5	2	3	2003	0.1	0.15	2003	Includes 1 workstation. O&M estimated at 5% of capital cost.
Integration for Incident Response	TM026	20	180	220	1995				Integration with other systems.
Software for Incident Response	TM019	2	13.5	16.5	1995	0.675	0.825	1995	Software is COTS.
Labor for Incident Response	TM020					90	110	2001	Labor for incident management coordinator (1 @ 100K).
Automated Incident Investigation System		5	15		2001				Includes workstation, tripod, monopole antenna, Auto Integration, and AutoCAD software.
Hardware for Traffic Information Dissemination	TM021	5	2	3	2003	0.1	0.15	2003	Includes 1 workstation. O&M estimated at 5% of capital cost.
Software for Traffic Information Dissemination	TM022	5	18	22	1995	0.9	1.1	1995	Software is COTS.
Integration for Traffic Information Dissemination	TM023	20	90	110	2000	4.5	5.5	1995	Integration with other systems.
Labor for Traffic Information Dissemination	TM024					90	110	2001	Labor for 1 operator @ 100K. Salary costs are fully loaded and include base salary, overtime, overhead, benefits, etc.
Software for Dynamic Electronic Tolls	TM027	5	22.5	27.5	1995	1.125	1.375	1995	Includes software installation and 1 year maintenance. Software is COTS.
Integration for Dynamic Electronic Tolls	TM028	20	90	110	1995	4.5	5.5	1995	Integration with other systems.
Hardware for Probe Information Collection	TM033	3	2	3	2003	0.1	0.15	2003	Includes 1 workstation. O&M estimated at 5% of capital cost.
Software for Probe Information Collection	TM034	5	18	22	1995	1.8	2.2	1995	Includes software installation and 1 year maintenance. Software is COTS.
Integration for Probe Information Collection	TM035	20	135	165	1995	13.5	16.5	1995	Integration with other systems.
Labor for Probe Information Collection	TM036					45	55	2001	Labor for 1 operator (4 hours per day @ 100K/year). Salary costs are fully loaded prices and include base salary, overtime, overhead, benefits, etc.
Software for Rail Crossing Monitor	TM037	5	18	22	1995	1.8	2.2	1995	Includes software installation and 1 year maintenance. Software is COTS.
Integration for Rail Crossing Monitor	TM038	20	90	110	1995				Integration with other systems.
Labor for Rail Crossing Monitor	TM039					45	55	2001	Operators (1 @ 50% of 100K). Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Road Weather Information System (RWIS)		25	25		1998	0.4	2.5	2001	A RWIS consists of several components: an environmental sensing station (ESS), CPU, workstation with RWIS software, and communications equipment. All components of the RWIS reside at the TMC with the exception of the ESS. See Roadside Detection subsystem for costs of ESS. Cost of the ESS ($10K-$50K) should be added to $25K listed here in order to cost out the entire system. CPU replaced every 5 years at a cost of $4K. O&M costs range includes communication, and optional weather forecast/meteorological service.

Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		Cost Date	O&M Cost ($K/year)		Cost Date	Description
			Low	High		Low	High		
Transit Management Center (TR)									
Basic Facilities, Comm for Large Area	TR014		4000	4000	1995	400	600	1995	For population >750,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Basic Facilities, Comm for Medium Area	TR015		3200	3200	1995	400	480	1995	For population <750,000 and >250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Basic Facilities, Comm for Small Area	TR016		2800	2800	1995	400	420	1995	For population <250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
Transit Center Hardware	TR001	5	6	9	2003	0.12	0.18	2003	Includes 3 workstations. O&M estimated at 2% of capital cost.
Transit Center Software, Integration	TR002	20	815	1720	1995	6	12	1995	Includes vehicle tracking & scheduling, database & information storage, schedule adjustment software, real time travel information software, and integration. Software is COTS.
Transit Center Additional Building Space	TR003					6	9	1995	Additional space required for ITS technology - $12-$18 / sq.ft.., 500 sq.ft..
Transit Center Labor	TR004					50	250	1995	Labor for 3 staff @ 75K. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Upgrade for Auto. Scheduling, Run Cutting, or Fare Payment	TR005	20	20	40	1995	0.4	0.8	1995	Processor/software upgrade, installation and 1 yr. maintenance (for processor). Software is COTS.
Integration for Auto. Scheduling, Run Cutting, or Fare Payment	TR012	20	225	500	1995				Integration with other systems.
Further Software Upgrade for E-Fare Payment	TR013	20	40	60	1995	0.8	1.2	1995	Software upgrade. Software is COTS. Automatic passenger counter processing software costs an additional $25K to several hundred thousand dollars depending on the system.
Vehicle Location Interface	TR007	20	10	15	1995				Vehicle location interface.
Video Monitors for Security System	TR008	5	3	7	2003	0.06	0.14	2003	Five per site. O&M estimated at 2% of capital cost.
Hardware for Security System	TR009	5	14	19	2003	0.28	0.38	2003	Includes 1 server and 3 workstations. O&M estimated at 2% of capital cost; could be higher for preventative and responsive maintenance.
Integration of Security System with Existing Systems	TR010	20	250	500	1995				Integration with other systems.
Labor for Security System	TR011					202	247	1995	Labor for 3 staff @ 75K each. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Toll Administration (TA)									
Toll Administration Hardware	TA001	5	4	6	2003	0.2	0.3	2003	Includes 2 workstations, printer, and modem. O&M estimated at 5% of capital costs.
Toll Administration Software	TA002	10	40	80	1995	4	8	1995	Includes local database and national database coordination. Software is COTS.
Transit Vehicle On-Board (TV)									
Driver Interface and Schedule Processor	TV001	10	0.3	0.5	1995	0.006	0.01	1995	On-board schedule processor and database.
Cell Based Communication Equipment	TV002	10	0.15	0.25	1995	0.0075	0.0125	1995	Cell-based radio with data capacity.
GPS/DGPS for Vehicle Location	TV003	10	0.5	2	2002	0.01	0.04	2002	AVL GPS/DGPS. Capital cost depends on features of unit. O&M cost (estimated at 2% of capital) is for unit maintenance and does not include annual telecom service fees.
Signal Preemption Processor	TV004	10	0.3	0.6	1995	0.006	0.01	1995	On-board schedule processor and database. Complement to IDAS elements RS004 and RS005.
Signal Preemption/Priority Emitter			0.5	2.1	2003				Data-encoded emitter; manually initiated. Complement to Roadside Signal Preemption/Priority (see Roadside Control subsystem).
Preemption/Priority Transponder			0.075		2000				Passive transponder mounted on underside of transit vehicle. Requires transit priority system at the Transit Management Center.
Trip Computer and Processor	TV005	10	0.1	0.15	1995	0.002	0.003	1995	On-board processor for trip reporting and data storage.
Security Package	TV006	10	4.2	7	1995	0.21	0.265	1995	On-board CCTV surveillance camera and hot button. The high capital cost represents a common installation of a digital event recorder system.
Electronic Farebox	TV007	10	0.8	1.5	1995	0.04	0.075	1995	On-board flex fare system DBX processor, on-board farebox, and smart card reader.
Automatic Passenger Counting System		10	1	10	2003				Low cost reflects the APC system as an add-on to an existing route scheduling or tracking system. High cost reflects the APC system as a stand alone installation. Cost is per vehicle and includes installation.
Commercial Vehicle Administration (CA)									
Commercial Vehicle Admin Hardware	CA001	5	6	9	2003	0.12	0.18	2003	Includes 3 workstations. O&M estimated at 2% of capital cost.
Commercial Vehicle Admin Software, Integration	CA002	20	200	220	1995	4	4.4	1995	Includes processor and integration. Software is COTS .
Commercial Vehicle Admin Labor	CA003					270	330	2003	Labor for 4 staff @ 75K (average). Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Software Upgrade for Electronic Credential Purchasing	CA004	20	60	140	1995	1.2	2.8	1995	Electronic credentials purchase software, database and management for post-trip processing & E-credentials.
Software Upgrade for Inter-Agency Information Exchange	CA005	20	20	40	1995	0.4	0.8	1995	Processor and integration add-on. Software is COTS.
Added Labor for Inter-Agency Information Exchange	CA006					67	82	1995	Labor for 1 staff @ 75K (average). Salary cost are fully loaded prices including base salary, overtime, benefits, etc.
Software Upgrade for Safety Administration	CA007	20	40	80	1995	0.8	1.6	1995	Database add-on, software, and integration. Software is COTS.

Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		Cost Date	O&M Cost ($K/year)		Cost Date	Description
			Low	High		Low	High		
Commercial Vehicle Check Station (CC)									
Check Station Structure	CC001	20	50	75	1995				Roadside structure - mainline w/ lane indicator signals.
Signal Board	CC002	10	10	15	1995	1	1.5	1995	Roadside signal board.
Signal Indicator	CC003	20	5	10	1995	0.25	0.5	1995	Signal indicator system.
Roadside Beacon	CC004	10	5	8	1995	0.5	0.8	1995	Roadside beacon used for electronic screening (not included in roadside subsystem). Beacon repair/replacement.
Wireline to Roadside Beacon	CC005	20	10	20	1995				Dedicated wireline communication from beacon to roadside (1 mile upstream).
Check Station Software, Integration	CC006	20	180	215	1995				Software, processor and integration.
Check Station Hardware	CC007	5	2	3	2003	0.04	0.06	2003	Includes 1 workstation. O&M estimated at 2% of capital cost.
Safety and Fitness Electronic Records (SAFER) Data Mailbox			7.5	9.2	1999	0.44	0.66	1999	Includes portable computer with printer and wireless Internet modem to download, record, and upload carrier safety database records at field locations or check stations.
Detection System	CC008	10	50	75	1995	2.5	3.75	1995	Commercial vehicle communication interface and communication device (cell based radio).
Software Upgrade for Safety Inspection	CC009	20	40	80	1995	0.8	1.6	1995	Safety-database add-on, and result writing to vehicle tag processor add-on. Software is COTS.
Handheld Safety Devices	CC010	5	3	5	1995	0.3	0.5	1995	For commercial vehicle inspection. The devices either measure data themselves or read data from the vehicle. Three per location.
Software Upgrade for Citation and Accident Recording	CC011	20	20	40	1995	1	2	1995	Software add-on for recording of citation and accident information to the commercial vehicle.
Weigh-In-Motion Facility	CC012	10	14	21	1995	1.4	2.1	1995	Includes WIM fixed load cell and interface to roadside facility. Software is COTS.
Wireline to Weigh-In-Motion Facility	CC013	10	1	2	1995	0.1	0.2	1995	Wireline communication (local line).
Commercial Vehicle On-Board (CV)									
Electronic ID Tag	CV001	10	0.65	1.1	1995	0.013	0.022	1995	Includes ID tag, additional software & processing, and database storage. Software is COTS.
Communication Equipment	CV002	10	1.15	2.25	1995	0.0075	0.0125	1995	Commercial vehicle communication interface and communication device (cell-based radio).
Central Processor and Storage	CV003	10	0.3	0.5	1995	0.006	0.01	1995	Equipment on board for the processing and storage of cargo material.
GPS/DGPS	CV004	10	0.5	1.8	2002	0.01	0.036	2002	GPS for vehicle location. Capital cost depends on features of unit. O&M cost (estimated at 2% of capital) is for unit maintenance and does not include annual telecom service fees.
Driver and Vehicle Safety Sensors, Software	CV005	10	1.1	2.2	1995	0.04	0.08	1995	Additional software and processor for warning indicator and audio system interface, and onboard sensors for engine/vehicle and driver. Software is COTS.
Cargo Monitoring Sensors and Gauges	CV006	10	0.17	0.35	1995	0.017	0.035	1995	Optional on-board sensors for measuring temperature, pressure, and load leveling.
Electronic Cargo Seal Disposable			0.01	0.025	2003				Cost for a disposable radio frequency identification (RFID) E-seal that provides a complete and accurate audit trail of seal status during transport. Low is for passive, and high is for active E-seal.
Electronic Cargo Seal Reusable			0.035	0.44	2002				Cost for a reusable radio frequency identification (RFID) E-seal that provides a complete and accurate audit trail of seal status during transport. Low is for passive, and high is for active E-seal. Depending on the vendor, some E-seals may incur a monthly service charge.
Autonomous Tracking Unit			0.35	0.8	2003	0.144	0.42	2003	Chassis or container mounted unit that tracks location and condition of assets (cost for on-board sensors not included). Higher priced units provide greater functionality, such as polling of location information and increased quantities of sensor data. Annual service charges include the communications link between unit and data center, and information services.
Fleet Management Center (FM)									
Fleet Center Hardware	FM001	5	6	9	2003	0.12	0.18	2003	Costs include 3 workstations. O&M estimated at 2% of capital cost.
Fleet Center Software, Integration	FM002	20	215	500	1995				Includes processor and integration. Software is COTS.
Fleet Center Labor	FM003					337	412	1995	Labor for 5 staff @ 75K. Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Software for Electronic Credentialing, Clearance	FM004	20	80	180	1995				Includes electronic credential purchase software, database and management for trip reports, and database management for preclearance. Software is COTS.
Software for Tracking and Scheduling	FM005	20	40	100	1995	4	10	1995	Vehicle tracking and scheduling. Software is COTS.
Vehicle Location Interface	FM006	20	10	15	1995				Vehicle location interface from FMS to TMS.
Software Upgrade for Fleet Maintenance	FM007	20	20	40	1995	0.4	0.8	1995	Processor/software upgrade to add capability to automatically generate preventative maintenance schedules from vehicle mileage data. Software is COTS.
Integration for Fleet Maintenance	FM008	20	100	200	1995	2	4	1995	Integration with other systems.
Software Upgrade for HAZMAT Management	FM009	20	20	40	1995	0.4	0.8	1995	Vehicle tracking & scheduling enhancement. Software is COTS.
Hardware Upgrade for HAZMAT Management	FM010	5	2	3	2003	0.04	0.06	2003	Includes 1 workstation. O&M estimated at 2% of capital cost.
Electronic Cargo Seal Reader			0.3	1.5	2002				Unit cost depends on quantity purchased. Low cost is for handheld reader. High cost is for fixed reader. Cost will be significantly increased if reader is equipped with additional security features.

Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		Cost Date	O&M Cost ($K/year)		Cost Date	Description
			Low	High		Low	High		
Vehicle On-Board (VS)									
Communication Equipment	VS001	7	0.2	0.4	1995	0.004	0.008	1995	Wireless data transceiver.
In-Vehicle Display	VS002	7	0.05	0.1	1995	0.001	0.002	1995	In-vehicle display/warning interface. Software is COTS.
In-Vehicle Signing System	VS003	7	0.16	0.4	1995	0.003	0.008	1995	Interface to active tag reader, processor for active tag decode, and display device for messages.
GPS/DGPS	VS004	7	0.25	0.5	1995	0.005	0.01	1995	Global Positioning System/Differential Global Positioning Systems.
GIS Software	VS005	7	0.2	0.3	1995				Geographical Information System (GIS) software for performing route planning.
Route Guidance Processor	VS006	7	0.1	0.15	1995	0.002	0.003	1995	Limited processor for route guidance functionality.
Sensors for Lateral Control	VS007	7	0.8	1.1	1995	0.016	0.022	1995	Includes lane sensors in vehicle and lateral sensors MMW radar.
Electronic Toll Equipment	VS008	7	0.04	0.1	1995				Active tag interface and debit/credit card interface.
Mayday Sensor and Processor	VS009	7	0.15	0.65	1995	0.003	0.013	1995	Collision detector sensor and interface for Mayday processor. Software is COTS.
Sensors for Longitudinal Control	VS010	7	0.3	0.5	1995	0.006	0.01	1995	Longitudinal sensors MMW radar.
Advanced Steering Control	VS011	7	0.5	0.6	1995	0.01	0.012	1995	Advanced steering control ("hands off" driving). Software is COTS.
Advanced Cruise Control	VS012	7	0.15	0.3	1995	0.003	0.006	1995	Adaptive cruise control (automatic breaking and accelerating).
Intersection Collision Avoidance Processor, Software	VS013	7	0.28	0.55	1995	0.006	0.011	1995	Software/processor for infrastructure transmitted information, interface to in-vehicle signing and audio system, software and processor to link to longitudinal and lateral vehicle control modules based on input signal from vehicle intersection collision warning equipment package. Software is COTS.
Vision Enhancement System	VS014	7	2	2.5	2003	0.1	0.125	2003	In-vehicle camera, software & processor, heads-up display, and infra-red sensors (local sensor system). Software is COTS. O&M estimated at 5% of capital.
Driver and Vehicle Safety Monitoring System	VS015	7	0.66	1.25	1995	0.033	0.063	1995	Safety collection processor and software, driver condition sensors, six vehicle condition sensors (@ $50 each), and vehicle data storage. Software is COTS.
Pre-Crash Safety System	VS016	7	1.1	2.15	1995	0.037	0.067	1995	Vehicle condition sensors, vehicle performance sensors, software/processor, interface, pre-crash safety systems deployment actuators. Software is COTS.
Software, Processor for Probe Vehicle	VS020	7	0.05	0.15	1995	0.001	0.003	1995	Software and processor for communication to roadside infrastructure, signal generator, message generator. Software is COTS.
Toll Tag/Transponder		5	0.025		2003				Most toll tags/transponders costs approx. $25. Some toll agencies require users to pay a refundable deposit in lieu of purchasing a tag. The user is charged the cost of the tag if the tag is lost.
In-Vehicle Navigation System		7	2.8		1998				COTS product that includes in-vehicle display and supporting software.
Personal Devices (PD)									
Basic PDA	PD001	7	0.2	0.4	2001	0.004	0.008	2001	Personal digital assistant. O&M estimated at 2% of capital.
Advanced PDA for Route Guidance, Interactive Info	PD002	7	0.5	0.75	1995	0.01	0.015	1995	Personal digital assistant with advanced capabilities (route guidance, interactive).
Modem Interface, Antenna for PDA	PD003	7	0.18	0.25	1995	0.004	0.005	1995	Modem interface and separate antenna for wireless capability.
PDA with Wireless Modem		2	0.2	0.6	2003	0.12	0.3	2001	Personal digital assistant with wireless modem. O&M based on monthly subscriber rate plans of 50 Kbytes (low) and 150 Kbytes (high).
GPS/DGPS	PD005	7	0.15	0.18	2001	0.003	0.004	2001	GPS/DGPS. O&M estimated at 2% of capital cost.
GIS Software	PD006	7	0.1	0.15	1995	0.005	0.008	1995	Additional GIS/GUI capability.

* Not available for all unit cost elements

Index Information for the ITS Unit Costs Database (as of March 31, 2005)

Conversion Ratios

	Index	2003/1995	2003/1998	2003/1999	2003/2000	2003/2001	2003/2002
1	WPU1176	0.9411		0.9361		0.9635	0.9805
2	WPU1178	0.7993	0.9080	0.9246	0.9351	0.9422	0.9827
3	PCU5112105112102	1.0027	0.9869		0.9486	0.9422	0.9514
4	PCU BBLD-BBLD	1.0912					
5	WPU115	0.3555	0.5684	0.6578		0.7844	
6	ECI11061I	1.3147				1.0793	
7	CUUR0000SA0	1.2073					

	Notes	
1	WPU1176	Applied to communications and related equipment
2	WPU1178	Applied to elements that contain electronic components
3	PCU5112105112102	Applied to software and integration elements
4	PCU BBLD-BBLD	Applied to physical dwellings at Centers and Toll Plaza
5	WPU115	Applied to computer hardware
6	ECI11061I	Applied to labor categories
7	CUUR0000SA0	Applied to ISP Liability Insurance (IS016)

Year-by-year index series from 1995-2003

1 **Series Id: WPU1176** **Source http://www.bls.gov/ppi/**
Not Seasonally Adjusted
Group: Machinery and equipment
Item: Communication and related equipment
Base Date: 8512

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1994	110	110.1	110.2	110.9	111	111.1	111.1	110.8	110.8	111	111.1	111.2	110.8
1995	111.9	112.1	112.1	112.2	112.1	111.9	111.8	111.9	112.3	112	112.3	112.2	112.1
1996	112.9	113.1	113	113	112.7	112.6	112.9	113.1	113.1	113	113	113.9	113
1997	113.9	114	113.4	113.5	113.7	113.6	114.4	114.2	114.1	114	114.8	114.8	114
1998	114.8	114.8	114.6	114.4	114.1	114.1	113.7	113.6	113.6	114	113.7	113.5	114.1
1999	114.3	114.2	114.1	114	113	112.8	112.6	112.1	111.2	111	111.3	111.3	112.7
2000	111.4	110.9	110.8	110.6	110.8	110.4	110.5	110.5	110.5	110	110.4	109.8	110.6
2001	110.3	110.3	110.3	109.6	109.6	109.5	109.2	109.2	109.2	109	109.1	109	109.5
2002	109.3	108.7	108.8	107.9	107.9	107.7	106.9	107.1	107.4	107	106.8	106.2	107.6
2003	106.1	105.7	106.4	106.2	106.1	105.7	104.8	104.9	105.2	105	105.2	105.2	105.5
2004	105	103.4	103.4	103.3	104.8(P)	103.4(P)	102.7(P)	102.9(P)					

P : Preliminary. All indexes are subject to revision four months after original publication.

2 **Series Id: WPU1178** **Source http://www.bls.gov/ppi/**

Not Seasonally Adjusted

Group: Machinery and equipment

Item: Electronic components and accessories

Base Date: 8200

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1994	117.4	117.5	117.6	117.4	117.4	117.5	117.4	116.5	115.9	115	115.1	114.8	116.6
1995	114.6	115	114.3	114.4	114	113.7	113.1	112.9	112.9	113	113.1	112.9	113.6
1996	112.5	112.2	110.8	109.4	108.5	107.9	108	108	108.1	107	107.3	107.2	108.9
1997	106.7	106	105.8	105.4	104.5	104.5	104.4	103	102.9	102	101.6	101.4	104
1998	101.1	100.7	100.7	100.4	100.1	100	99.7	99.6	99.5	99.4	99.2	99.1	100
1999	98.8	98.6	98.6	98.3	98.1	97.8	97.6	97.7	98.1	98.3	98.2	97.9	98.2
2000	97.2	96.9	96.8	97.3	97.1	97.3	97.7	97.6	97.5	97.2	96.9	96.1	97.1
2001	95.9	95.3	95.1	94.9	94.6	94	93.5	92.9	92.6	92.4	92.6	92.7	93.9
2002	92.8	93	93.2	92.8	92.5	92.5	92.3	92.3	92.3	92	92	91.5	92.4
2003	91.3	91.1	91.2	91.3	91.4	91.1	90.9	90.6	90.3	90.2	90.3	89.7	90.8
2004	88.9	89.4	89.2	89.6	89.9(P)	89.6(P)	89.7(P)	89.6(P)					

P : Preliminary. All indexes are subject to revision four months after original publication.

3 **Series Id: PCU5112105112102** **Source http://www.bls.gov/ppi/**

Industry: Software publishers
Product: Applications software
Base Date: 9712

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1997												100	
1998	101.2	99.1	97.9	97.8	99.7	99.8	99.2	98.1	100.2	100	98.3	98.2	99.1
1999	99.1	99.5	99.5	99.5	99.3	100	99.8	100.6	99.9	99.9	99.7	99.6	99.7
2000	100	101.1	99.2	101.9	103.1	100.8	103.2	106.2	106.3	107	104.2	103.9	103.1
2001	105.3	104	104.7	107.8	103.1	103.8	100.2	103.5	103.6	104	103	103.9	103.8
2002	103.9	103.8	103.2	102	102.2	102	102.1	103.2	103	103	102.3	102.8	102.8
2003	98.6	100.2	99.3	99.5	99.5	99	100.1	97.7	94.2	94.6	95.7	95	97.8
2004	94.3	94.9	94.6	94.9	93.9(P)	93.3(P)	94.1(P)	92.9(P)					

P : Preliminary. All indexes are subject to revision four months after original publication.

NOTE: Index data was not available for 1995. The 1995 annual value was derived using linear regression. A linear trendline was developed using data points from March 2000 and before. Based on this trendline, we estimate a 0.52 decrease in the annual index from year to year. The 1995 annual index value is estimated to be 97.5.

4 **Series ID : PCUBBLD--BBLD--** **Source http://www.bls.gov/ppi/**

Not Seasonally Adjusted
Industry : Non-residential buildings
Product : Non-residential buildings
Base Date : 8606

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1994	119.5	119.8	120.1	120.3	120.6	121.2	121.5	121.9	122.3	123	123.2	123.4	121.4
1995	124.3	124.7	125.3	125.9	126.1	126.2	126.5	126.7	126.9	127	126.8	126.8	126.1
1996	127	127.1	127.3	127.6	128.1	128.4	128.4	128.6	129	129	129.3	129.3	128.2
1997	129.6	129.9	130	130.3	130.7	130.7	130.8	130.9	130.9	131	130.9	130.7	130.5
1998	130.6	130.6	130.7	131.1	131.2	131.4	131.6	131.6	131.7	132	131.4	131.1	131.2
1999	131.4	131.5	131.8	132.3	132.6	133.1	133.5	133.9	133.9	134	134	134.2	133
2000	134.7	135.2	135.7	135.8	135.5	136	135.8	135.5	135.9	136	135.7	135.6	135.6
2001	135.8	136	135.9	136.2	136.8	136.7	136.2	136.2	136.3	136	135.3	134.9	136
2002	135.1	135.1	135.4	135.8	135.8	135.8	136	136.3	136.4	136	136	135.9	135.8
2003	136.2	136.6	136.8	136.8	136.9	137	137.5	137.8	138.8	139	139.2	139.1	137.6
2004	140.5	142	144	146.3	148.5(P)	148.6(P)	149.2(P)	150.8(P)					

P : Preliminary. All indexes are subject to revision four months after original publication.

5 **Series Id: WPU115** **Source http://www.bls.gov/ppi/**

Not Seasonally Adjusted
Group: Machinery and equipment
Item: Electronic computers and computer equipment
Base Date: 9812

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
1994	193.5	191.6	192.6	191.4	190.5	190.1	188.8	187.6	187.8	185	182.9	183	188.7
1995	181.1	178.4	176.9	177.3	176.1	174.2	173.1	170.2	168.7	168	166.4	165.8	173
1996	163.1	159.5	157.5	153.4	152.2	150.5	148.7	148	146.9	145	142.9	140.7	150.7
1997	139.6	138	136.7	135.1	130.9	129.3	127.9	126.3	125	124	122.4	121.6	129.7
1998	118.9	116.1	113.8	110.9	109.4	108.6	107.3	105	104.4	102	101.8	100	108.2
1999	97.9	97.3	96.7	95	94.5	94	92.9	91.6	91.3	90.8	90.4	89.9	93.5
2000	88.8	88.4	87.7	87.1	86.2	85.9	86	85.3	85.1	85.2	85	84.2	86.3
2001	82.9	81.7	80.5	80.4	80	79.1	78.6	76.1	76.1	75.6	75	74.6	78.4
2002	72.6	71.5	71	70.8	70.3	69.4	68.4	67.5	67.1	66.4	65.6	65.4	68.9
2003	64.7	63.9	62.9	62.8	62.1	61.8	61.5	60.7	60.6	59.5	58.9	58.4	61.5
2004	58.2	57.9	57.7	57.7	57.4(P)	57.2(P)	56.7(P)	56.5(P)					

P : Preliminary. All indexes are subject to revision four months after original publication.

6 **Series Id: ECU11061I** **Source http://www.bls.gov/ncs/ect/home.htm**

Not Seasonally Adjusted
compensation: Total compensation
ownership: Civilian
periodicity: Index number
group: All workers, excluding sales occupations

Year	Qtr1	Qtr2	Qtr3	Qtr4	Annual
1994	121.6	122.4	123.7	124.2	
1995	125.2	125.9	126.9	127.5	
1996	128.6	129.4	130.5	131.2	
1997	132.1	133	134.2	135.3	
1998	136.4	137.4	138.8	139.5	
1999	140.5	141.7	143.2	144.5	
2000	146.3	147.7	149.4	150.5	
2001	152.5	153.8	155.6	156.8	
2002	158.4	159.7	161.3	162.2	
2003	164.6	165.9	167.7	168.6	
2004	170.8				

7 **Series Id: CUUR0000SA0** **Source http://www.bls.gov/cpi/home.htm**

Not Seasonally Adjusted
Area: U.S. city average
Item: All items
Base Period: 1982-84=100

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	HALF1	HALF2
1994	146.2	146.7	147.2	147.4	147.5	148	148.4	149	149.4	150	149.7	149.7	148.2	147.2	149.3
1995	150.3	150.9	151.4	151.9	152.2	152.5	152.5	152.9	153.2	154	153.6	153.5	152.4	151.5	153.2
1996	154.4	154.9	155.7	156.3	156.6	156.7	157	157.3	157.8	158	158.6	158.6	156.9	155.8	157.9
1997	159.1	159.6	160	160.2	160.1	160.3	160.5	160.8	161.2	162	161.5	161.3	160.5	159.9	161.2
1998	161.6	161.9	162.2	162.5	162.8	163	163.2	163.4	163.6	164	164	163.9	163	162.3	163.7
1999	164.3	164.5	165	166.2	166.2	166.2	166.7	167.1	167.9	168	168.3	168.3	166.6	165.4	167.8
2000	168.8	169.8	171.2	171.3	171.5	172.4	172.8	172.8	173.7	174	174.1	174	172.2	170.8	173.6
2001	175.1	175.8	176.2	176.9	177.7	178	177.5	177.5	178.3	178	177.4	176.7	177.1	176.6	177.5
2002	177.1	177.8	178.8	179.8	179.8	179.9	180.1	180.7	181	181	181.3	180.9	179.9	178.9	180.9
2003	181.7	183.1	184.2	183.8	183.5	183.7	183.9	184.6	185.2	185	184.5	184.3	184	183.3	184.6
2004	185.2	186.2	187.4	188	189.1	189.7	189.4	189.5						187.6	

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				Low	High		Low	High		
	Roadside Telecommunications (RS-TC)									
1	DS0 Communication Line	TC001	10	0.5	0.9	1995	0.6	1.2	2003	56Kbps capacity. Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
1	DS1 Communication Line	TC002	20	0.5	0.9	1995	4.7	8.2	2002	1.544Mbps capacity (T1 line). Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
1	DS3 Communication Line	TC003	20	2.8	4.7	1995	23	69	2001	44.736 Mbps capacity (T3 line). Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
1	ISP Service Fee	TC007					0.18	0.6	2002	Monthly service fee ranges from $15 per month for regular dial-up service to $50 per month for DSL.
1	Direct Bury Armor Encased Fiber Cable			56		1999	0.02		1999	Cost is per mile. Includes cable and installation.
1	Conduit Design and Installation - Corridor		20	50	65	2003	0.02		1999	Cost is per mile. Includes boring, trenching, and conduit (3 or 4 inch). Cost would be significantly less for an aerial installation. In-ground installation would cost significantly less if implemented in conjunction with a construction project.
1	Twisted Pair Installation		20	11		1999	0.02		1999	Cost is per mile.
1	Fiber Optic Cable Installation		20	20	50	2003	0.02		1999	Cost is per mile for cable and in-ground installation. Cost would be significantly less for an aerial installation. In-ground installation would cost significantly less if implemented in conjunction with a construction project.
1	Cellular Communication			0.5		1999	0.3	0.4	1999	Cost is for one unit.
1	900 MHz Spread Spectrum Radio		10	8.4		1999	0.14	0.4	1999	Cost is per link.
1	Microwave Communication		10	9.8	19.6	2002	0.5	1	2002	Cost is per link. Cost could be higher depending on tower/antenna installation.
1	Wireless Communications, Low Usage	TC004					0.12	0.2	2003	125 Kbytes/month available usage (non-continuous use).
1	Wireless Communications, Medium Usage	TC005					0.6	0.7	1995	1,000 Kbytes/month available usage (non-continuous use).
1	Wireless Communications, High Usage	TC006	20	0.5	0.9	1995	1.2	1.8	2002	3,000 Kbytes/month available usage (non-continuous use).
1	Call Box		10	4	5.8	2002			1999	Capital cost includes call box and installation. O&M is cost per unit (per year) for service maintenance contract and annual cellular service fee.
	Roadside Detection (RS-D)									
2	Inductive Loop Surveillance on Corridor		5	3	8	2001	0.4	0.6	1995	Double set (4 loops) with controller, power, etc.
2	Inductive Loop Surveillance at Intersection		5	9	16	2003	0.9	1.5	1999	Four legs, 2 lanes/approach.
2	Machine Vision Sensor on Corridor		10	21.7	29	2003	0.2	0.4	2003	One sensor both directions of travel. Does not include installation.
2	Machine Vision Sensor at Intersection		10	20	25.7	2003	0.2	0.5	2003	Four-way intersection, one camera per approach. Does not include installation.
2	Passive Acoustic Sensor on Corridor			3.6	7.9	2002	0.2	0.4	1998	Cost range is for a single sensor covering up to 5 lanes. Low cost is for basic sensor, which consists of the sensor, mounting kit, junction box, & cabinet termination card. High cost includes basic sensor with solar and wireless option. This option consists of an antenna, solar charger, battery, & panel, and wireless base station, which will handle up to 8 sensors. Capital costs do not include installation or mounting structure.
2	Passive Acoustic Sensor at Intersection			5	14	2001	0.2	0.4	2002	Four sensors, 4 leg intersection.
2	Remote Traffic Microwave Sensor on Corridor		10	3.2	5.9	2002	0.1		2001	One sensor both directions of travel. Includes installation.
2	Remote Traffic Microwave Sensor at Intersection		10	17		2001	0.1		2001	Four sensors, 4 leg intersection. Includes installation.
2	Infrared Sensor Active			5.6	7	2000				Sensors detects movement in two directions and determines vehicle speed, classification, and lane position.
2	Infrared Sensor Passive			0.7	1.2	2002				Sensor covers one lane and detects vehicle count, volume, and classification.
2	CCTV Video Camera	RS007	10	7.5	17	2003	1.4	2.3	2001	Cost includes color video camera with pan, tilt, and zoom (PTZ), and installation.
	CCTV Video Camera Tower	RS008	20	4	12	2003				Low cost is for a 35 ft. tower. High cost is for 90 ft. tower. Includes foundation, pole, conduit, and labor.
2	Pedestrian Detection Microwave			0.6		2001				Cost is per device. Typical deployment consists of 2 devices per crosswalk for detection of pedestrian in crosswalk. Can be used for detection of pedestrian at the curbside.
2	Pedestrian Detection Infrared			0.3	0.5	2002				Cost is per device. Does not included installation. Typical deployment consists of 2 devices per crosswalk for detection of pedestrian at the sidewalk. Can be used for detection of pedestrian in the crosswalk.
2	Environmental Sensing Station (Weather Station)		25	30	50	2003	1.9	4.1	2003	Environmental Sensing Station (ESS), also known as a weather station, consists of pavement temperature sensor, subsurface temperature sensor, precipitation sensor (type & rate), wind sensor (speed & direction), air temperature and humidity sensors, visibility sensors, and remote processing unit (RPU). ESS provide condition data and are basic components of larger Road Weather Information Systems (see RWIS under TMC subsystem). RPU replaced every 5 years at $6.4K. O&M includes calibration, equipment repairs, and replacement of damaged equipment. O&M costs could be higher if state provided maintenance.
2	Traffic Camera for Red Light Running Enforcement			71	128	2001	57		2001	Low capital range is for a 35-mm wet film camera, which includes installation of the camera ($25K) and associated equipment (e.g., pole, loop detectors, cabinet foundation). High capital range is for digital camera, which includes a total of 2 cameras for a 3-lane approach. O&M cost is for one 35-mm wet film camera per year. Note, most jurisdictions contract with a vendor to install and maintain, and process the back office functions of the RLR system. The vendor receives compensation from fines charged to violators.
	Lowering System		20	8	10.5	2003				Cost includes the lowering system and the pole (pole height ranging 40 feet to 70 feet). Installation costs not included. The lowering system is mechanically operated; requires routine lubrication.
2	Portable Speed Monitoring System		15	4.9	14.7	2002				Trailer mounted two-digit dynamic message sign, radar gun, computer; powered by generator or operates off of solar power; and requires minimal operations and maintenance work. The system determines a vehicle's speed with the radar gun and displays the current speed, in real-time, and also stores the speeds in a computer for further analysis.
2	Portable Traffic Management System			80	100	2003				This portable unit collects traffic data, communicates with a central control facility, and displays real time traffic information to travelers. The system includes a trailer mounted dynamic message sign and mast equipped with a PTZ video camera, sensors, and wireless communications. Cost will vary depending on the type and number of traffic sensors installed.

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				Low	High		Low	High		
	Roadside Control (RS-C)									
2	Linked Signal System LAN	RS002	20	32	56	1995	0.3	0.6	1995	This element provides the connections to the linked signal system.
2	Signal Controller Upgrade for Signal Control	RS003	20	2.5	6	2003	0.2	0.4	1995	Local controller upgrade to provide advanced signal control.
2	Signal Controller and Cabinet			8	15	2003	0.2	0.5	2001	Includes installation of traffic signal controller and cabinet per intersection.
2	Traffic Signal			90	108	2001	2.2	2.8	1999	Includes installation for one signal (four leg intersection), conduit, controller, and detection device. Cost ranges from traffic signal with inductive loop detection (low) to non-intrusive detection (high).
2	Signal Preemption Receiver	RS004	5	2	6	1995	0.04	0.2	1995	Two per intersection. Complement of IDAS elements RS005 and TV004.
2	Signal Controller Upgrade for Signal Preemption	RS005	10	2	4	1995				Add-on to base capability (per intersection). Complement of IDAS elements RS004 and TV004.
2	Roadside Signal Preemption/Priority			2.5	5.5	2003				Includes infrared detector, detector cable, phase selector, and system software. Capital costs range is for 2-directions (low) and 4-directions (high). Does not include installation costs. Complement to transit (or emergency vehicle) on-board Signal Preemption/Priority Emitter.
2	Ramp Meter	RS006	5	25	50	2003	1.2	2.8	2003	Includes ramp meter assembly, signal displays, controller, cabinet, detection, and optimization.
3	Software for Lane Control	RS011	20	25	50	1995	3	5	1995	Software and hardware at site. Software is off-the-shelf technology and unit price does not reflect product development.
2	Lane Control Gates	RS012	20	80	120	1995	1.6	2	1995	Per location.
2	Fixed Lane Signal	RS009	20	5	6	1995	0.5	0.6	1995	Cost per signal.
2	Automatic Anti-icing System Short span		12	23		1998	1.8		1998	Typical automatic anti-icing system consists of a control system, chemical storage tank, distribution lines, pump, and nozzles. Pump and control hardware replaced every 5 years at cost of $3.5K. For a short span system ranging from 120 to 180 feet. O&M includes system maintenance, utilities, materials, and labor.
2	Automatic Anti-icing System Long Span		12	46	458	1999	1.4	27.3	1999	Typical automatic anti-icing system consists of a control system, chemical storage tank, distribution lines, pump, and nozzles. Pump and control hardware replaced every 5 years at cost of $3.5K. For a long span system ranging from 320 feet to greater than 1/2 mile. O&M includes system maintenance, utilities, materials, and labor. The high O&M cost is for a much larger system; hence, the need for a greater amount of materials.
	Roadside Information (RS-I)									
2	Roadside Message Sign	RS010	20	40	60	1995	2	3	1995	Fixed message board for HOV and HOT lanes.
1	Wireline to Roadside Message Sign	RS013	20	6	8	1995				Wireline to VMS (0.5 mile upstation).
2	Variable Message Sign	RS015	20	48	120	2003	2.4	6	2003	Low capital cost is for smaller VMS installed along arterial. High capital cost is for full matrix, LED, 3-line, walk-in VMS installed on freeway. Cost does not include installation.
	Variable Message Sign Tower	RS016	20	25	120	2003				Low capital cost is for a small structure for arterials. High capital cost is for a larger structure spanning 3-4 lanes. VMS tower structure requires minimal maintenance.
2	Variable Message Sign - Portable		14	21	25	2002	1.1	1.9	2000	Trailer mounted VMS (3-line, 8" character display); includes trailer, solar or diesel powered.
1	Highway Advisory Radio	RS017	20	15	31	2001	0.6	1	2001	Capital cost is for a 10-watt HAR. Includes processor, antenna, transmitters, battery back-up, cabinet, rack mounting, lighting, mounts, connectors, cable, and license fee. Super HAR costs an additional $9-10K (larger antenna). Primary use of the super HAR is to gain a stronger signal.
2	Highway Advisory Radio Sign		10	5	9	2003	0.25		2003	Cost is for a HAR sign with flashing beacons. Includes cost of the controller.
2	Roadside Probe Beacon	RS020	5	5	8	2001	0.5	0.8	2001	Two-way device (per location).
2	LED Count-down Signal		10	0.306	0.424	2001				Costs range from low (two 12x12-inch dual housing unit) to high (16X18-inch single housed unit). Signal indicates time remaining for pedestrian to cross, and a walk or don't walk icon. Count-down signals use low 8-watt LED bulbs, which require replacement approximately every 5-7 years.
2	Pedestrian Crossing Illumination System		5	27.5	42	2003	2.6	4	2001	The capital cost range includes cost of equipment and installation. Equipment includes fixtures - 4 lamps per lane - for a three lane crosswalk, controller, pole, and push button activator. Installation is estimated at 150 - 200 % of the total equipment cost. Capital cost would be greater if the system included automated activation of the in-pavement lighting system. O&M is approximately 10% of the equipment cost.
2	Variable Speed Display Sign			3.5	4.7	2001				Low range is for a variable speed limit display system. High range includes static speed sign, speed detector (radar), and display system.
	Roadside Rail Crossing (R-RC)									
2	Rail Crossing 4-Quad Gate, Signals	RS021	20	92	104	1995	3.4	3.9	1995	Gates and signals.
2	Rail Crossing Train Detector	RS022	20	13	17	1995	0.62	0.82	1995	Train detector circuitry and communication line from intelligent interface controller (IIC) to wayside interface equipment (WIE). Assume two track crossing with two 0.5 mile communication lines.
2	Rail Crossing Controller	RS023	10	6	8	1995	0.3	0.4	1995	Intelligent interface controller (IIC).
2	Rail Crossing Pedestrian Warning Signal, Gates	RS024	20	8	12	1995	0.2	0.2	1995	Pedestrian warning signal and gates.
2	Rail Crossing Trapped Vehicle Detector	RS025	10	20	24	1995	1	1.2	1995	Entrapped vehicle detection camera, with poles and controller.
	Parking Management (PM)									
2	Entrance/Exit Ramp Meters		10	2	4	1995	0.2	0.4	1995	Ramp meters are used to detect and count vehicles entering/existing the parking facility. O&M costs based on annual service contract.
2	Tag Readers		10	2	4	1995	0.2	0.4	1995	Readers support electronic payment scheme. O&M costs based on annual service contract.
3	Database and Software for Billing & Pricing		10	10	15	1995	1	2	1995	Database system contains parking pricing structure and availability. O&M costs based on annual service contract.
2	Parking Monitoring System		10	19	42	1998				Includes installation, detectors, and controllers.
	Toll Plaza (TP)									
2	Electronic Toll Reader	TP001	10	2	5	2001	0.2	0.5	2001	Readers (per lane). O&M is estimated at 10% of capital cost.
2	High-Speed Camera	TP002	10	7	10	2003	0.4	0.8	1995	Cost includes 1 camera/2 lanes.
3	Electronic Toll Collection Software	TP003	10	5	10	1995				Includes COTS software and database.
4	Electronic Toll Collection Structure	TP004	20	11	16	1995				Mainline structure.

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				Low	High		Low	High		
	Remote Location (RM)									
2	CCTV Camera	RM001	7	2.1	5	2003	0.1	0.25	2003	Interior fixed mount camera for security. Low cost represents black & white pan/tilt/zoom (PTZ). High cost represents color PTZ. Does not include installation.
3	Integration of Camera with Existing Systems	RM002	10	2	2.5	1995				Per location.
2	Informational Kiosk	RM003	7	11	24	2001	1.1	4.5	1998	Includes hardware, enclosure, installation, modem server, and map software.
3	Integration of Kiosk with Existing Systems	RM004	7	2.2	27.5	1995				Software costs are for COTS (low) and developed/outdoor (high).
3	Kiosk Upgrade for Interactive Usage	RM005	5	5	8	1995	0.5	0.8	1995	Interactive information display interface (upgrade from existing interface).
3	Kiosk Software Upgrade for Interactive Usage	RM006	5	10	12	1995				Software is COTS.
2	Transit Status Information Sign		10	4	8	2002				A LED display installed at transit terminal that provides status information on transit arrival. Cost depends on quality, size, and controller capabilities.
2	Smart Card Vending Machine	RM007	5	30	32	1995	1.5	1.6	1995	Ticket vending machine for smart card.
3	Software, Integration for Smart Card Vending	RM008	20	3	5	1995				Software is COTS.
	Emergency Response Center (ER)									
4	Basic Facilities, Comm for Large Area	EM006		4365		1995	436	655	1995	For population >750,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
4	Basic Facilities, Comm for Medium Area	EM007		3492		1995	436	524	1995	For population <750,000 and >250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
4	Basic Facilities, Comm for Small Area	EM008		3055		1995	436	458	1995	For population <250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
5	Emergency Response Hardware	EM001	5	6	9	2003	0.12	0.18	2003	Includes 3 workstations. O&M is estimated at 2% of capital cost.
3	Emergency Response Software	EM002	10	70	150	1995	0.5	3.5	1995	Includes emergency response plans database, vehicle tracking software, and real time traffic coordination.
6	Emergency Response Labor	EM003					66	217	1995	Description is based on 1995 data: Two people. Salary costs are fully loaded including salary, overtime, overhead, benefits, etc.
3	Emergency Management Communications Software	EM004	20	5	10	1995	2.5	5	1995	Shared database between 4 sites. Cost is per site; software is COTS.
3	Hardware, Software Upgrade for E-911 and Mayday	EM005	10	105	180	1995	1.7	2.5	1995	Data communications translation software, E911 interface software, processor, and 3 workstations.
1	800 MHz. 2-way Radio		5	0.8	1.6	2001	0.09	0.12	2001	Cost is per radio.
	Emergency Vehicle On-Board (EV)									
1	Communications Interface	EV001	10	0.3	2	1995	0.02		1995	Emergency vehicle communications. Cost is per vehicle.
2	Signal Preemption/Priority Emitter			0.5	2.1	2003				Data-encoded emitter; manually initiated. Complement to Roadside Signal Preemption/Priority (see Roadside Control subsystem).
	Information Service Provider (ISP)									
4	Basic Facilities, Comm for Large Area	IS019		4365		1995	436	655	1995	For population >750,000. (stand-alone) Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
4	Basic Facilities, Comm for Medium Area	IS020		3492		1995	436	524	1995	For population <750,000 and >250,000. (stand-alone) Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
4	Basic Facilities, Comm for Small Area	IS021		3055		1995	436	458	1995	For population <250,000. (stand-alone) Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
5	Information Service Provider Hardware	IS001	5	26	35	2003	0.5	0.7	2003	Includes 2 servers and 5 workstations. O&M is estimated at 2%; could be higher for responsive and preventative maintenance.
3	Systems Integration	IS017	20	89	109	1998				Integration with other systems.
3	Information Service Provider Software	IS002	20	276	551	1995	13.8	27.6	1995	Includes database software (COTS) and traffic analysis software.
3	Map Database Software	IS003	2	15	30	2003				Software is COTS.
6	Information Service Provider Labor	IS004					230	329	1995	Description is based on 1995 data: 2 Staff @ 50K to 75K and 1 staff @ 75K to 100K. Salary cost are fully loaded prices and include base salary, overtime, overhead, benefits, etc.
1	FM Subcarrier Lease	IS005					113	226	1995	Cost is per year.
5	Hardware Upgrade for Interactive Information	IS006	5	12	16	2003	0.24	0.32	2003	Includes 1 server and 2 workstations. O&M is estimated at 2%; could be higher for responsive and preventative maintenance.
3	Software Upgrade for Interactive Information	IS007	20	251	501	1995	13	25	1995	Trip planning software (includes some development costs).
6	Added Labor for Interactive Information	IS008					131	197	1995	Description is based on 1995 data: 1 Staff @ 50K to 75K for two shifts. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
3	Software Upgrade for Route Guidance	IS009	20	251	501	1995	13	25	1995	Route selection software. Software is COTS.
3	Map Database Upgrade for Route Guidance	IS010	2	100	201	1995				Map database software upgrade.
5	Hardware Upgrade for Emergency Route Planning	IS011	5	8	10	2003	0.16	0.2	2003	Includes 1 server. O&M is estimated at 2%; could be higher for responsive and preventative maintenance.
3	Software Upgrade for Emergency Route Planning	IS012	20	50	100	1995	2.5	5	1995	Route guidance software. Software is COTS.
5	Hardware Upgrade for Dynamic Ridesharing	IS013	5	4	6	2003	0.08	0.12	2003	Includes 2 workstations. O&M is estimated at 2%; could be higher for responsive and preventative maintenance.
3	Software Upgrade for Dynamic Ridesharing	IS014	20	99	197	1998	5	10	1995	Software includes some development cost.
6	Added Labor for Dynamic Ridesharing	IS015					131	197	1995	Description is based on 1995 data: 1 Staff @ 50K to 75K for two shifts. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
7	Liability Insurance for Dynamic Ridesharing	IS016					60	121	1995	Description is based on 1995 data: 50K to 100K per year.
3	Software Upgrade for Probe Information Collection	IS018	20	251	501	1995	13	25	1995	Software includes COTS and some development cost.

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				Low	High		Low	High		
	Transportation Management Center (TM)									
4	Basic Facilities, Comm for Large Area	TM040		3500	8000	2003	350	1200	2003	For population >750,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc. O&M is estimated at 10-15% of the capital cost.
4	Basic Facilities, Comm for Medium Area	TM041		3492		1995	436	524	1995	For population <750,000 and >250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc. O&M is estimated at 10-15% of the capital cost.
4	Basic Facilities, Comm for Small Area	TM042		3055		1995	436	458	1995	For population <250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc. O&M is estimated at 10-15% of the capital cost.
5	Hardware for Signal Control	TM001	5	18.5	28.5	2003	9	10.5	2003	Includes I server and multiple workstations. O&M includes responsive and preventative maintenance.
3	Software, Integration for Signal Control	TM006	5	105	150	2003	150		2003	Software and integration for a large urban area. Cost would be lower (approx.$10,500) for a few arterial intersections. O&M includes software upgrades, revisions, and expansion of the system.
6	Labor for Signal Control	TM002					525	641	2001	Description is based on 2001 data: Costs include labor for operations (2 @ 50% of the time, at 100K), transportation engineer (1 at 50% of the time, at 100K), update timing plans (2K per system per month for every 10 systems), and signal maintenance technician (2 @ 75K). Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
3	Hardware, Software for Traffic Surveillance	TM003	20	135	165	1995	6.8	8.3	1995	Processor and software.
3	Integration for Traffic Surveillance	TM032	20	226	276	1995	11.3	13.8	1995	Integration with other systems.
5	Hardware for Freeway Control	TM004	5	6	9	2003	0.3	0.45	2003	Includes 3 workstations. O&M estimated at 5% of capital cost.
3	Software, Integration for Freeway Control	TM007	5	171	209	2002				Software and integration, installation and 1 year maintenance. Software is off-the-shelf technology and unit cost does not reflect product development.
6	Labor for Freeway Control	TM005					243	297	2001	Description is based on 2001 data: Labor for operations (2 @ 50% of 100K) and maintenance technicians (2 @ 75K). Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
5	Hardware for Lane Control	TM008	5	2	3	2003	0.1	0.15	2003	Includes 1 workstation and 19" monitor. O&M estimated at 5% of capital cost.
3	Software, Integration for Lane Control	TM009	10	226	276	1995	11	14	1995	Software development and integration and software upgrade for controllers. Software development is fine tune adjustments for local installations. Otherwise, software is COTS.
6	Labor for Lane Control	TM010					97	119	2001	Description is based on 2001 data: Labor for 2 operators @ 50% of 100K.
3	Software, Integration for Regional Control	TM011	10	296	395	1998				Software and integration, installation and 1 year maintenance. Integration with other TMC's. Software is COTS.
3	Real-time, Traffic Adaptive Signal Control System		10	113	141	2001	19		2001	The costs range is based on commercially available packages, which run on a centralized computer. The high capital cost includes software packages for graphical user interface and incident management.
6	Labor for Regional Control	TM012					194	237	2001	Description is based on 2001 data: Labor for operators (2 @ 50% of 100K), transportation engineer (1 @ 50% of 100K), and maintenance contract. Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
5	Video Monitors, Wall for Incident Detection	TM013	15	57	103	2003	3	5	2003	Video wall and monitors. O&M estimated at 5% of capital cost.
5	Hardware for Incident Detection	TM014	5	43	57	2003	2.15	2.85	2003	Includes 4 servers, 5 workstations, and 2 laser printers. O&M estimated at 5% of capital cost; could be higher for responsive and preventative maintenance.
3	Integration for Incident Detection	TM025	20	90	110	1995	4.5	5.5	1995	Integration with other systems.
3	Software for Incident Detection	TM015	5	86	105	2002	4.3	5.2	2002	Software is COTS and includes development cost. O&M is estimated at 5% of capital.
6	Labor for Incident Detection	TM016					680	831	2001	Description is based on 2001 data: Labor for operators (4 @ 100K and 1 manager @ 150K) and 2 maintenance techs @ 75K.
5	Video Monitor for Incident Response	TM017	5	0.6	1.5	2003				Includes 1 19" monitor.
5	Hardware for Incident Response	TM018	5	2	3	2003	0.1	0.15	2003	Includes 1 workstation. O&M estimated at 5% of capital cost.
3	Integration for Incident Response	TM026	20	180	221	1995				Integration with other systems.
3	Software for Incident Response	TM019	2	14	17	1995	0.677	0.827	1995	Software is COTS.
6	Labor for Incident Response	TM020					97	119	2001	Description is based on 2001 data: Labor for incident management coordinator (1 @ 100K).
2	Automated Incident Investigation System		5	14.1		2001				Includes workstation, tripod, monopole antenna, Auto Integration, and AutoCAD software.
5	Hardware for Traffic Information Dissemination	TM021	5	2	3	2003	0.1	0.15	2003	Includes 1 workstation. O&M estimated at 5% of capital cost.
3	Software for Traffic Information Dissemination	TM022	5	18	22	1995	0.9	1.1	1995	Software is COTS.
3	Integration for Traffic Information Dissemination	TM023	20	85	104	2000	4.5	5.5	1995	Integration with other systems.
6	Labor for Traffic Information Dissemination	TM024					97	119	2001	Description is based on 2001 data: Labor for 1 operator @ 100K. Salary costs are fully loaded and include base salary, overtime, overhead, benefits, etc.
3	Software for Dynamic Electronic Tolls	TM027	5	23	28	1995	1.1	1.4	1995	Includes software installation and 1 year maintenance. Software is COTS.
3	Integration for Dynamic Electronic Tolls	TM028	20	90	110	1995	4.5	5.5	1995	Integration with other systems.
5	Hardware for Probe Information Collection	TM033	3	2	3	2003	0.1	0.15	2003	Includes 1 workstation. O&M estimated at 5% of capital cost.
3	Software for Probe Information Collection	TM034	5	18	22	1995	1.8	2.2	1995	Includes software installation and 1 year maintenance. Software is COTS.
3	Integration for Probe Information Collection	TM035	20	135	165	1995	14	17	1995	Integration with other systems.
6	Labor for Probe Information Collection	TM036					49	59	2001	Description is based on 2001 data: Labor for 1 operator (4 hours per day @ 100K/year). Salary costs are fully loaded prices and include base salary, overtime, overhead, benefits, etc.
3	Software for Rail Crossing Monitor	TM037	5	18	22	1995	1.8	2.2	1995	Includes software installation and 1 year maintenance. Software is COTS.
3	Integration for Rail Crossing Monitor	TM038	20	90	110	1995				Integration with other systems.
6	Labor for Rail Crossing Monitor	TM039					49	59	2001	Description is based on 2001 data: Operators (1 @ 50% of 100K). Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
5	Road Weather Information System (RWIS)		25	14		1998	0.3	2	2001	Description is based on unadjusted data values: A RWIS consists of several components: an environmental sensing station (ESS), CPU, workstation with RWIS software, and communications equipment. All components of the RWIS reside at the TMC with the exception of the ESS. See Roadside Detection subsystem for costs of ESS. Cost of the ESS ($10K-$50K) should be added to $25K listed here in order to cost out the entire system. CPU replaced every 5 years at a cost of $4K. O&M costs range includes communication, and optional weather forecast/meteorological service.

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				Low	High		Low	High		
	Transit Management Center (TR)									
4	Basic Facilities, Comm for Large Area	TR014		4365		1995	436	655	1995	For population >750,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
4	Basic Facilities, Comm for Medium Area	TR015		3492		1995	436	524	1995	For population <750,000 and >250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
4	Basic Facilities, Comm for Small Area	TR016		3055		1995	436	458	1995	For population <250,000. Based on purchase of building rather than leasing space. Communications includes communications equipment internal to the facility such as equipment racks, multiplexers, modems, etc.
5	Transit Center Hardware	TR001	5	6	9	2003	0.12	0.18	2003	Includes 3 workstations. O&M estimated at 2% of capital cost.
3	Transit Center Software, Integration	TR002	20	817	1725	1995	6	12	1995	Includes vehicle tracking & scheduling, database & information storage, schedule adjustment software, real time travel information software, and integration. Software is COTS.
4	Transit Center Additional Building Space	TR003					7	10	1995	Description is based on 1995 data: Additional space required for ITS technology - $12-$18 / sq.ft.., 500 sq.ft..
6	Transit Center Labor	TR004					66	329	1995	Description is based on 1995 data: Labor for 3 staff @ 75K. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
3	Upgrade for Auto. Scheduling, Run Cutting, or Fare Payment	TR005	20	20	40	1995	0.4	0.8	1995	Processor/software upgrade, installation and 1 yr. maintenance (for processor). Software is COTS.
3	Integration for Auto. Scheduling, Run Cutting, or Fare Payment	TR012	20	226	501	1995				Integration with other systems.
3	Further Software Upgrade for E-Fare Payment	TR013	20	40	60	1995	0.8	1.2	1995	Software upgrade. Software is COTS. Automatic passenger counter processing software costs an additional $25K to several hundred thousand dollars depending on the system.
3	Vehicle Location Interface	TR007	20	10	15	1995				Vehicle location interface.
5	Video Monitors for Security System	TR008	5	3	7	2003	0.06	0.14	2003	Five per site. O&M estimated at 2% of capital cost.
5	Hardware for Security System	TR009	5	14	19	2003	0.28	0.38	2003	Includes 1 server and 3 workstations. O&M estimated at 2% of capital cost; could be higher for preventative and responsive maintenance.
3	Integration of Security System with Existing Systems	TR010	20	251	501	1995				Integration with other systems.
6	Labor for Security System	TR011					266	325	1995	Description is based on 1995 data: Labor for 3 staff @ 75K each. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
	Toll Administration (TA)									
5	Toll Administration Hardware	TA001	5	4	6	2003	0.2	0.3	2003	Includes 2 workstations, printer, and modem. O&M estimated at 5% of capital costs.
3	Toll Administration Software	TA002	10	40	80	1995	4.0	8.0	1995	Includes local database and national database coordination. Software is COTS.
	Transit Vehicle On-Board (TV)									
2	Driver Interface and Schedule Processor	TV001	10	0.2	0.4	1995	0.005	0.01	1995	On-board schedule processor and database.
1	Cell Based Communication Equipment	TV002	10	0.14	0.24	1995	0.0071	0.0118	1995	Cell-based radio with data capacity.
2	GPS/DGPS for Vehicle Location	TV003	10	0.5	2	2002	0.01	0.039	2002	AVL GPS/DGPS. Capital cost depends on features of unit. O&M cost (estimated at 2% of capital) is for unit maintenance and does not include annual telecom service fees.
2	Signal Preemption Processor	TV004	10	0.2	0.5	1995	0.005	0.008	1995	On-board schedule processor and database. Complement to IDAS elements RS004 and RS005.
2	Signal Preemption/Priority Emitter			0.5	2.1	2003				Data-encoded emitter; manually initiated. Complement to Roadside Signal Preemption/Priority (see Roadside Control subsystem).
2	Preemption/Priority Transponder			0.07		2000				Passive transponder mounted on underside of transit vehicle. Requires transit priority system at the Transit Management Center.
2	Trip Computer and Processor	TV005	10	0.1	0.12	1995	0.002	0.002	1995	On-board processor for trip reporting and data storage.
2	Security Package	TV006	10	3.4	6	1995	0.17	0.21	1995	On-board CCTV surveillance camera and hot button. The high capital cost represents a common installation of a digital event recorder system.
2	Electronic Farebox	TV007	10	0.6	1.2	1995	0.03	0.06	1995	On-board flex fare system DBX processor, on-board farebox, and smart card reader.
2	Automatic Passenger Counting System		10	1	10	2003				Low cost reflects the APC system as an add-on to an existing route scheduling or tracking system. High cost reflects the APC system as a stand alone installation. Cost is per vehicle and includes installation.
	Commercial Vehicle Administration (CA)									
5	Commercial Vehicle Admin Hardware	CA001	5	6	9	2003	0.12	0.18	2003	Includes 3 workstations. O&M estimated at 2% of capital cost.
3	Commercial Vehicle Admin Software, Integration	CA002	20	201	221	1995	4	4.4	1995	Includes processor and integration. Software is COTS .
6	Commercial Vehicle Admin Labor	CA003					270	330	2003	Description is based on 1995 data: Labor for 4 staff @ 75K (average). Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
3	Software Upgrade for Electronic Credential Purchasing	CA004	20	60	140	1995	1.2	2.8	1995	Electronic credentials purchase software, database and management for post-trip processing & E-credentials.
3	Software Upgrade for Inter-Agency Information Exchange	CA005	20	20	40	1995	0.4	0.8	1995	Processor and integration add-on. Software is COTS.
6	Added Labor for Inter-Agency Info Exchange	CA006					88	108	1995	Description is based on 1995 data: Labor for 1 staff @ 75K (average). Salary cost are fully loaded prices including base salary, overtime, benefits, etc.
3	Software Upgrade for Safety Administration	CA007	20	40	80	1995	0.8	1.6	1995	Database add-on, software, and integration. Software is COTS.

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				Low	High		Low	High		
	Commercial Vehicle Check Station (CC)									
4	Check Station Structure	CC001	20	55	82	1995				Roadside structure - mainline w/ lane indicator signals.
2	Signal Board	CC002	10	8	12	1995	0.8	1.2	1995	Roadside signal board.
2	Signal Indicator	CC003	20	4	8	1995	0.2	0.4	1995	Signal indicator system.
2	Roadside Beacon	CC004	10	4	6	1995	0.4	0.6	1995	Roadside beacon used for electronic screening (not included in roadside subsystem). Beacon repair/replacement.
1	Wireline to Roadside Beacon	CC005	20	9	19	1995				Dedicated wireline communication from beacon to roadside (1 mile upstream).
3	Check Station Software, Integration	CC006	20	180	216	1995				Software, processor and integration.
5	Check Station Hardware	CC007	5	2	3	2003	0.04	0.06	2003	Includes 1 workstation. O&M estimated at 2% of capital cost.
5	Safety and Fitness Electronic Records (SAFER) Data Mailbox			4.9	6.1	1999	0.29	0.43	1999	Includes portable computer with printer and wireless Internet modem to download, record, and upload carrier safety database records at field locations or check stations.
1	Detection System	CC008	10	47	71	1995	2.4	3.5	1995	Commercial vehicle communication interface and communication device (cell based radio).
3	Software Upgrade for Safety Inspection	CC009	20	40	80	1995	0.8	1.6	1995	Safety-database add-on, and result writing to vehicle tag processor add-on. Software is COTS.
2	Handheld Safety Devices	CC010	5	2	4	1995	0.2	0.4	1995	For commercial vehicle inspection. The devices either measure data themselves or read data from the vehicle. Three per location.
3	Software Upgrade for Citation and Accident Recording	CC011	20	20	40	1995	1	2	1995	Software add-on for recording of citation and accident information to the commercial vehicle.
3	Weigh-In-Motion Facility	CC012	10	14	21	1995	1.4	2.1	1995	Includes WIM fixed load cell and interface to roadside facility. Software is COTS.
1	Wireline to Weigh-In-Motion Facility	CC013	10	1	2	1995	0.1	0.2	1995	Wireline communication (local line).
	Commercial Vehicle On-Board (CV)									
2	Electronic ID Tag	CV001	10	0.52	0.9	1995	0.01	0.018	1995	Includes ID tag, additional software & processing, and database storage. Software is COTS.
1	Communication Equipment	CV002	10	1.1	2.1	1995	0.0071	0.0118	1995	Commercial vehicle communication interface and communication device (cell-based radio).
2	Central Processor and Storage	CV003	10	0.2	0.4	1995	0.005	0.01	1995	Equipment on board for the processing and storage of cargo material.
2	GPS/DGPS	CV004	10	0.5	1.8	2002	0.01	0.035	2002	GPS for vehicle location. Capital cost depends on features of unit. O&M cost (estimated at 2% of capital) is for unit maintenance and does not include annual telecom service fees.
2	Driver and Vehicle Safety Sensors, Software	CV005	10	0.9	1.8	1995	0.03	0.06	1995	Additional software and processor for warning indicator and audio system interface, and onboard sensors for engine/vehicle and driver. Software is COTS.
2	Cargo Monitoring Sensors and Gauges	CV006	10	0.14	0.28	1995	0.014	0.028	1995	Optional on-board sensors for measuring temperature, pressure, and load leveling.
2	Electronic Cargo Seal Disposable			0.01	0.025	2003				Cost for a disposable radio frequency identification (RFID) E-seal that provides a complete and accurate audit trail of seal status during transport. Low is for passive, and high is for active E-seal.
2	Electronic Cargo Seal Reusable			0.034	0.43	2002				Cost for a reusable radio frequency identification (RFID) E-seal that provides a complete and accurate audit trail of seal status during transport. Low is for passive, and high is for active E-seal. Depending on the vendor, some E-seals may incur a monthly service charge.
2	Autonomous Tracking Unit			0.35	0.8	2003	0.144	0.42	2003	Chassis or container mounted unit that tracks location and condition of assets (cost for on-board sensors not included). Higher priced units provide greater functionality, such as polling of location information and increased quantities of sensor data. Annual service charges include the communications link between unit and data center, and information services.
	Fleet Management Center (FM)									
5	Fleet Center Hardware	FM001	5	6	9	2003	0.12	0.18	2003	Costs include 3 workstations. O&M estimated at 2% of capital cost.
3	Fleet Center Software, Integration	FM002	20	216	501	1995				Includes processor and integration. Software is COTS.
6	Fleet Center Labor	FM003					443	542	1995	Description is based on 1995 data: Labor for 5 staff @ 75K. Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
3	Software for Electronic Credentialing, Clearance	FM004	20	80	180	1995				Includes electronic credential purchase software, database and management for trip reports, and database management for preclearance. Software is COTS.
3	Software for Tracking and Scheduling	FM005	20	40	100	1995	4	10	1995	Vehicle tracking and scheduling. Software is COTS.
3	Vehicle Location Interface	FM006	20	10	15	1995				Vehicle location interface from FMS to TMS.
3	Software Upgrade for Fleet Maintenance	FM007	20	20	40	1995	0.4	0.8	1995	Processor/software upgrade to add capability to automatically generate preventative maintenance schedules from vehicle mileage data. Software is COTS.
3	Integration for Fleet Maintenance	FM008	20	100	201	1995	2	4	1995	Integration with other systems.
3	Software Upgrade for HAZMAT Management	FM009	20	20	40	1995	0.4	0.8	1995	Vehicle tracking & scheduling enhancement. Software is COTS.
5	Hardware Upgrade for HAZMAT Management	FM010	5	2	3	2003	0.04	0.06	2003	Includes 1 workstation. O&M estimated at 2% of capital cost.
2	Electronic Cargo Seal Reader			0.3	1.5	2002				Unit cost depends on quantity purchased. Low cost is for handheld reader. High cost is for fixed reader. Cost will be significantly increased if reader is equipped with additional security features.

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				Low	High		Low	High		
	Vehicle On-Board (VS)									
1	Communication Equipment	VS001	7	0.2	0.4	1995	0.004	0.008	1995	Wireless data transceiver.
2	In-Vehicle Display	VS002	7	0.04	0.1	1995	0.001	0.002	1995	In-vehicle display/warning interface. Software is COTS.
2	In-Vehicle Signing System	VS003	7	0.13	0.32	1995	0.002	0.006	1995	Interface to active tag reader, processor for active tag decode, and display device for messages.
2	GPS/DGPS	VS004	7	0.2	0.4	1995	0.004	0.01	1995	Global Positioning System/Differential Global Positioning Systems.
3	GIS Software	VS005	7	0.2	0.3	1995				Geographical Information System (GIS) software for performing route planning.
2	Route Guidance Processor	VS006	7	0.08	0.12	1995	0.002	0.002	1995	Limited processor for route guidance functionality.
2	Sensors for Lateral Control	VS007	7	0.6	0.9	1995	0.013	0.018	1995	Includes lane sensors in vehicle and lateral sensors MMW radar.
2	Electronic Toll Equipment	VS008	7	0.03	0.1	1995				Active tag interface and debit/credit card interface.
2	Mayday Sensor and Processor	VS009	7	0.12	0.5	1995	0.002	0.01	1995	Collision detector sensor and interface for Mayday processor. Software is COTS.
2	Sensors for Longitudinal Control	VS010	7	0.2	0.4	1995	0.005	0.01	1995	Longitudinal sensors MMW radar.
2	Advanced Steering Control	VS011	7	0.4	0.5	1995	0.008	0.01	1995	Advanced steering control ("hands off" driving). Software is COTS.
2	Advanced Cruise Control	VS012	7	0.12	0.24	1995	0.002	0.005	1995	Adaptive cruise control (automatic breaking and accelerating).
2	Intersection Collision Avoidance Processor, Software	VS013	7	0.22	0.44	1995	0.005	0.009	1995	Software/processor for infrastructure transmitted information, interface to in-vehicle signing and audio system, software and processor to link to longitudinal and lateral vehicle control modules based on input signal from vehicle intersection collision warning equipment package. Software is COTS.
2	Vision Enhancement System	VS014	7	2	2.5	2003	0.1	0.125	2003	In-vehicle camera, software & processor, heads-up display, and infra-red sensors (local sensor system). Software is COTS. O&M estimated at 5% of capital.
2	Driver and Vehicle Safety Monitoring System	VS015	7	0.53	1	1995	0.026	0.05	1995	Description is based on 1995 data: Safety collection processor and software, driver condition sensors, six vehicle condition sensors (@ $50 each), and vehicle data storage. Software is COTS.
2	Pre-Crash Safety System	VS016	7	0.9	1.7	1995	0.03	0.05	1995	Vehicle condition sensors, vehicle performance sensors, software/processor, interface, pre-crash safety systems deployment actuators. Software is COTS.
3	Software, Processor for Probe Vehicle	VS020	7	0.05	0.15	1995	0.001	0.003	1995	Software and processor for communication to roadside infrastructure, signal generator, message generator. Software is COTS.
2	Toll Tag/Transponder		5	0.025		2003				Most toll tags/transponders costs approx. $25. Some toll agencies require users to pay a refundable deposit in lieu of purchasing a tag. The user is charged the cost of the tag if the tag is lost.
2	In-Vehicle Navigation System		7	2.5		1998				COTS product that includes in-vehicle display and supporting software.
	Personal Devices (PD)									
2	Basic PDA	PD001	7	0.2	0.4	2001	0.004	0.008	2001	Personal digital assistant. O&M estimated at 2% of capital.
2	Advanced PDA for Route Guidance, Interactive Information	PD002	7	0.4	0.6	1995	0.01	0.012	1995	Personal digital assistant with advanced capabilities (route guidance, interactive).
2	Modem Interface, Antenna for PDA	PD003	7	0.14	0.2	1995	0.003	0.004	1995	Modem interface and separate antenna for wireless capability.
2	PDA with Wireless Modem		2	0.2	0.6	2003	0.11	0.3	2001	Personal digital assistant with wireless modem. O&M based on monthly subscriber rate plans of 50 Kbytes (low) and 150 Kbytes (high).
2	GPS/DGPS	PD005	7	0.14	0.17	2001	0.003	0.004	2001	GPS/DGPS. O&M estimated at 2% of capital cost.
3	GIS Software	PD006	7	0.1	0.15	1995	0.005	0.008	1995	Additional GIS/GUI capability.

* Not available for all unit cost elements

Reference Notes

ITS unit costs data is now available in two formats: unadjusted and adjusted. Please read the information below. Comments and feedback are encouraged. Send correspondence to Barbara Staples at bstaples@mitretek.org.

This Excel file contains 4 worksheets:

--Equipment List Not Adjusted - this is the cost data with the dollar year for capital and O&M cost identified. The header on this worksheet is "ITS Unit Costs Database (as of March 31, 2005)." This page is formatted to print a total of 7 pages.

--Indexes - this sheet contains the index series and ratio values used to adjust the cost data. Also, the year-by-year index for 1995 to 2003 for each series is provided. This page is formatted to print a total of 8 pages.

--Equipment List Adjusted 2003 - this is the adjusted cost data. The header for this worksheet is "ITS Unit Costs Database (in 2003 dollars) As of March 31, 2005." This page is formatted to print a total of 7 pages. The far left column "Index" contains a number. The number corresponds to the index on the Indexes worksheet and is the index used to adjust the capital and/or O&M cost values to 2003 dollars. The index is representative of the ITS element. For example, the first element in Roadside Telecommunications, DS0 Communication Line, is tagged with Index 1. Index 1 is WPU1176 and is applied to communications and related equipment. The capital cost range is an adjusted value and was adjusted from 1995 (see column labeled "Adjusted From Date"). The O&M costs are 2003 values obtained in Mitretek's analysis (as such, no adjustment needed).

--Reference Notes - this worksheet.

Users are advised that they can select other indexes they think may be more appropriate. The formulas are setup such that users can enter another index ratio and the calculations will be automatic.